DOCUMENT RESUME

ED 393 996 CE 071 293

TITLE	Hazardous Communication and Tools for Quality: Basic Statistics. Responsive Text. Educational Materials for the Workplace.
INSTITUTION	Vermont Inst. for Self-Reliance, Rutland.
SPONS AGENCY	Office of Vocational and Adult Education (ED), Washington, DC. National Workplace Literacy Program.
PUB DATE	96
NOTE	24p.
AVAILABLE FROM	B.E.S.T., Vermont Institute for Self-Reliance, 128 Merchants Row, Room 202, Rutland, VT 05701 (guide and Responsive Text diskettes).
PUB TYPE	Guides - Classroom Use - Teaching Guides (For Teacher) (052)
EDRS PRICE	MF01/PC01 Plus Postage.
DESCRIPTORS	Adult Education; Adult Literacy; *Communication Skills; *Computer Assisted Instruction; *Hazardous Materials; *Job Skills; Learning Modules; Problem Solving; *Reading Instruction; Reading Skills; *Total Quality Management; Vocational Education

ABSTRACT

This guide provides a description of Responsive Text (RT), a method for presenting job-relevant information within a computer-based support system. A summary of what RT is and why it is important is provided first. The first section of the guide provides a brief overview of what research tells about the reading process and how the general design of RT conforms to current theoretical views of reading. This review of reading theory provides a framework for a detailed description of RT design and operation. The balance of the document describes the RT lessons, including the following: the four-lesson sequence, Working with Hazardous Materials, which covers the major hazardous materials topics required by the Occupational Safety and Health Administration; the three modules in Tools for Quality that introduce some skills and techniques used in most Total Quality Management programs; the three modules in the Communications sequence; the two-module sequence on Bloodborne Pathogens; and the lesson on Creative Problem Solving. (YLB)

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ED 393 996

Responsive Text

Educational Materials for the Workplace

Hazardous Communication

and

Tools for Quality: Basic Statistics

sample

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What is Responsive Text and Why Should I Care?

A quick summary for busy people

What is Responsive Text?

Responsive Text™ is a method for presenting job-relevant information within a computer-based support system. Responsive Text enables adults to learn about concepts in topics like Total Quality Management, Hazardous Material Handling, and Communication skills while getting assistance in the basic skills needed to understand these topics.

What level of literacy is needed to take advantage of Responsive Text?

Experience shows that intermediate to advanced readers gain the most from the unassisted use of Responsive Text. For beginning readers, Responsive Text can be used with an instructor for more focused lessons on decoding or vocabulary.

You need not even have a problem with basic skills to benefit from Responsive Text. Even with the speech and background supports turned off, the material provides solid interactive instruction in relevant topics. By integrating basic skills instruction with training material useful to all levels, we remove the stigma often associated with *remedial* instruction.

Are computer skills necessary for a student to use Responsive Text?

Responsive Text takes advantage of the point-and-click capabilities of the computer. The necessary mouse and clicking/dragging skills can be learned in a short time, and most computers include a lesson that teach these actions.

Learning how to use the capabilities of Responsive Text takes more time. It involves not only associating the different buttons with their information response but also learning when and how to use this information.

How much computer experience does the instructor need?

Loading the software onto the computer requires some basic knowledge of the Macintosh. Once Responsive Text is on the computer, its operation requires no special computer skills.

Why does this software seem more complicated than other materials?

Responsive Text is based on real reading tasks. The materials convey information relevant to the workplace in both content and style. Instead of being "dumbed down", the computer's ability to present graphics, sound, and simulations means that the material can be made smarter and more responsive to the user's needs.

Introduction

In 1990 LexIcon Systems began working with the Vermont Institute for Self Reliance (VISR) on a federally-funded workplace literacy project. LexIcon explored how the emerging multimedia capabilities of computers could be used to assist workers in reading training manuals, learning safety procedures, and other job-relevant tasks. The result is an approach called Responsive Text™.

This guide provides a description of Responsive Text. We begin with a brief overview of what research tells us about the reading process and how the general design of Responsive Text conforms to current theoretical views of reading. This review of reading theory provides a framework for a detailed description of Responsive Text design and operation. The balance of the document describes all of the Responsive Text lessons that are completed.

Responsive Text and Reading Theory

Responsive Text is based on what we know about fluent readers. Before describing how the program works it is useful to review what research has found about the reading process and how these findings are reflected in Responsive Text.

Reading as a multi-level process

Most theories of reading describe comprehension as a multi-level process and proficient readers bring many skills to the reading task. These include:

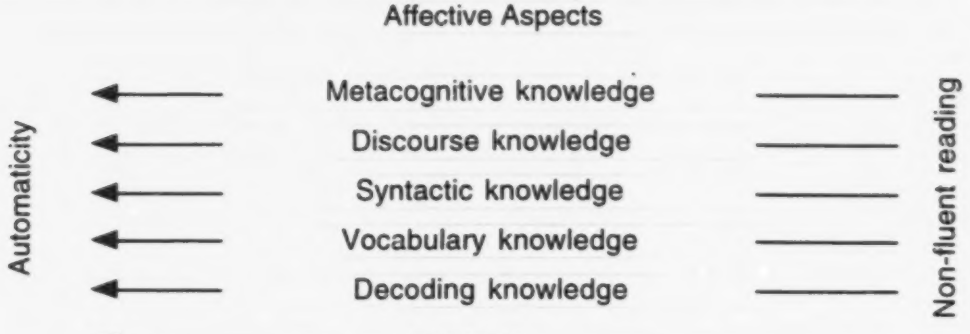

Figure 1. A multilevel model of reading

Decoding Knowledge. At the most basic level, reading proficiency requires decoding visual representations of words into a phonological representation (Gough & Hillinger, 1980). While poor readers may be able to decode words, the process is often difficult and diverts attention from higher-level comprehension.

Vocabulary knowledge. As Chall (1983) notes, reading beyond the earliest stages requires a store of background knowledge. Knowledge of vocabulary, phrases, and idioms, all gained through reading, is necessary for later reading stages. Poor readers are often deficient in the necessary background knowledge to understand a passage.

Syntactic knowledge. All languages follow predictable rules of grammar. While most of us cannot state these rules, we implicitly use them to form grammatical spoken sentences. This knowledge of syntax provides clues that a good reader will use in comprehending written language.

Discourse knowledge. Written language has its own structure that a good reader can utilize. Narratives generally follow a common form of introducing characters, plot, and resolution. As readers gain experience they can use this "story grammar" to guide their reading. Expository text also has many structural cues, such as text headings and subheadings, that provide valuable information.

Metacognitive knowledge. Good readers monitor their comprehension, continuously asking "Does this make sense? What am I doing? Does it work?" This monitoring allows the readers to adjust their reading to meet different task demands. Baker & Brown (1984) have noted that poor readers often have difficulty monitoring their comprehension of a passage.

Non-fluent reading to automaticity

How and when these processes are used depends on the fluency of the reader and the difficulty of the reading material. At the earliest stages of reading development the reader's attention is focused on decoding and understanding simple sentences. With practice these lower-level processes become more automatic, allowing the reader to shift more attention to higher-level processes.

Mature readers can shift the relative importance of these processes with the difficulty of the text. With familiar material, fluent readers focus their attention on higher-level comprehension, but when confronted with unfamiliar and/or more complex material, they may shift their focus to lower levels.

Responsive Text design

This theoretical framework leads to these design principals:

Use multimedia to support reading comprehension. Poor readers may need help at one or more levels of reading, and Responsive Text uses the computer to provide this assistance (Figure 2). A reader who has difficulty decoding can have the computer provide a spoken version. When vocabulary is weak, the system can provide background of varying complexity.

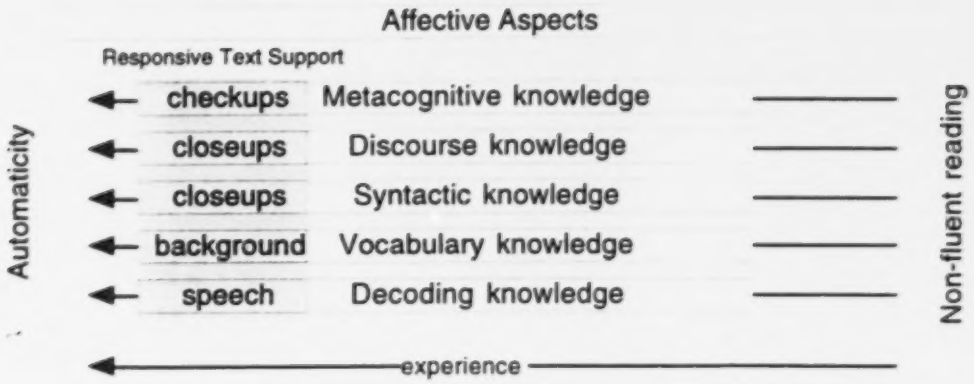

Figure 2. Responsive Text Support Structure

Encourage reading as an active process. Higher-level comprehension requires that readers ask questions, make predictions, and find information. To encourage this, Responsive Text poses questions, provides writing opportunities, and allows the reader to explore more detailed information.

Integrate multiple forms of literacy. As Kirsch & Jungeblut (1986) have demonstrated, literacy requires more than knowing how to read; what they refer to as *Prose Literacy*. In real life we have to read and interpret charts, tables, and graphs, which they call *Document Literacy*. We also must frequently draw upon math skills, which they refer to as *Quantitative Literacy*, to comprehend numerical relationships and evaluate simple data. Responsive text supports skills in prose, document, and quantitative literacy.

View literacy contextually. Literacy should be viewed within the context of the reading task. While basic skills instruction is often considered as a prerequisite to training job-relevant skills, the distinction between a basic skill and job skill is not always clear. Responsive Text embeds basic-skill support and instruction within job-relevant content. If a reader needs help on a graph in the Basic Statistics component of *Tools for Quality* or a new medical term in *Bloodborne Pathogens*, Responsive Text can provide the basic skill instruction within a relevant context.

By making basic skill support an integral part of the lesson, Responsive Text removes the distinction between training basic skills and job skills. It provides a bridge between programs that provide extensive but generic basic skill instruction and commercial job training programs (See also Hillinger, 1992).

Responsive Text Overview

To understand how Responsive Text operates, we have provided sample lessons from two of the topics. The first, *Understanding Hazardous Materials*, is drawn from the Hazcomm series. The second, *Basic Statistics*, comes from the series *Tools for Quality*. Both samples are fully operational. They differ from the actual lessons only in the number of words that can be spoken.

Signing in. The opening screen displays the names of users on the system. If your name is not displayed you can select a slot (by clicking on it when the cursor is inside it) and type your name. Your name remains in that slot until it is overwritten by another user.

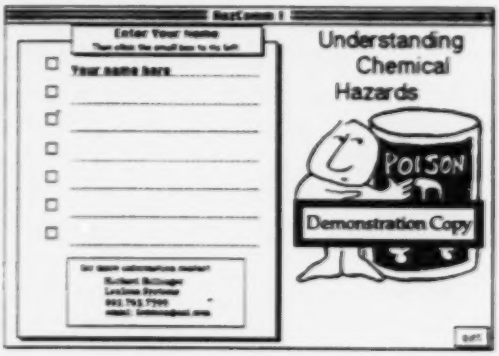

Figure 3. Opening Screen

After locating your name, click the small box to its left. Two buttons *Press here to begin* and *Check Results* will appear. Click on *Press here to begin*. If this is not your first session, the system will ask if you wish to continue on the page where you left off. Otherwise you will be started on the first page of the materials.

Moving through the lesson. Moving through Responsive Text is similar to turning pages in a book. To move to the next "page," click on the arrow in the upper right. To move to the previous page, use the arrow in the upper left.

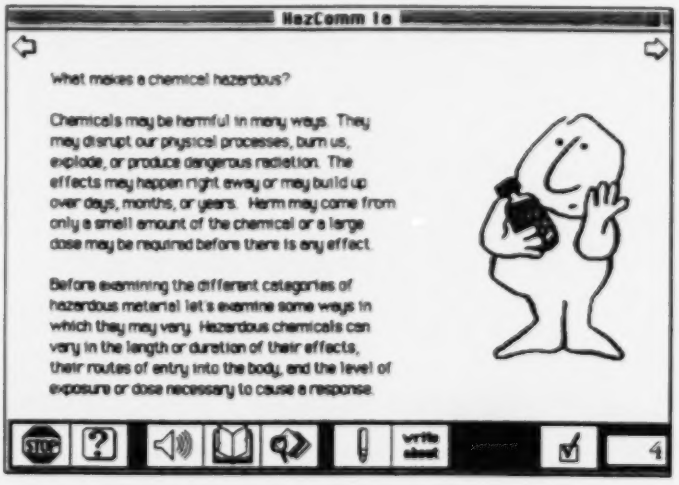
HazComm 1a
What makes a chemical hazardous?
Chemicals may be harmful in many ways. They may disrupt our physical processes, burn us, explode, or produce dangerous radiation. The effects may happen right away or may build up over days, months, or years. Harm may come from only a small amount of the chemical or a large dose may be required before there is any effect.
Before examining the different categories of hazardous material let's examine some ways in which they may vary. Hazardous chemicals can vary in the length or duration of their effects, their routes of entry into the body, and the level of exposure or dose necessary to cause a response.
STOP
write about
4

Figure 4. Responsive Text Screen Layout

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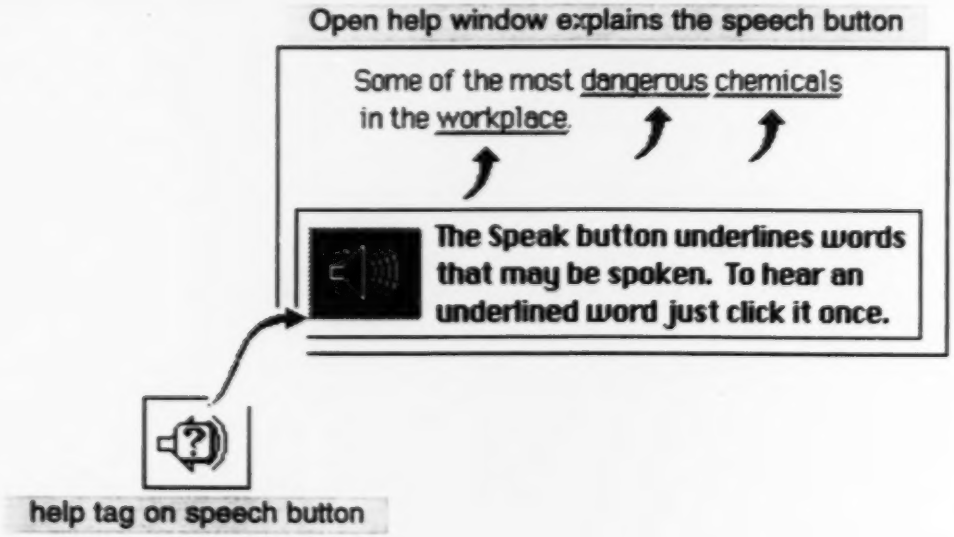
Using the Responsive Text Supports While you could go through all of the lesson using only these forward and back arrows, it is more likely you will use some of the supports accessed through the other screen buttons. Beginning in the lower left corner these buttons are as follows:

Stop

Pressing STOP ends your current session and saves all progress information. The button also stores the page on which you ended so that you can return to it when you resume the lesson. Before turning off the computer, you should stop the program with this button.

Help

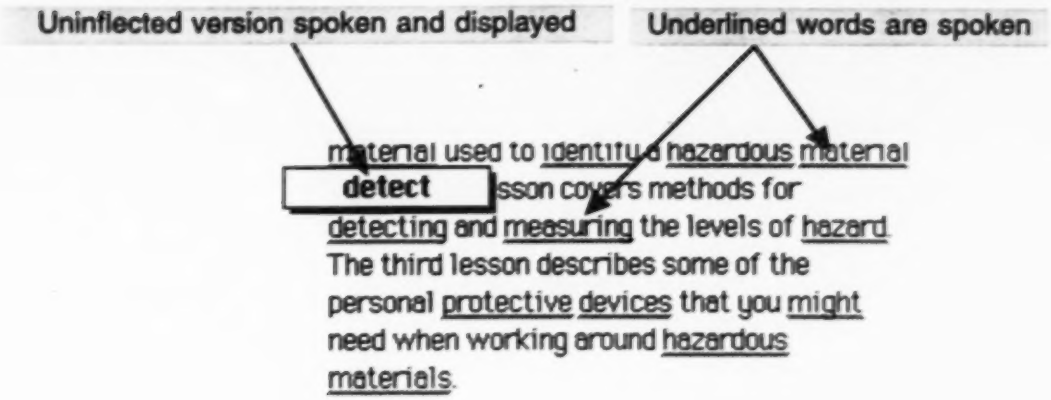
If you are confused about a button's operation, you may click on the HELP button to display help tags next to each button. Click on the help tag next to the button in question to get a description of its use.


Open help window explains the speech button
Some of the most dangerous chemicals in the workplace.
The Speak button underlines words that may be spoken. To hear an underlined word just click it once.
help tag on speech button

Speech

Decoding words--the action of transforming written symbols into sound using rules of pronunciation--is frequently the first stumbling block encountered by poor readers. Responsive Text provides digitally encoded speech to assist decoding. When the speech button is ON,

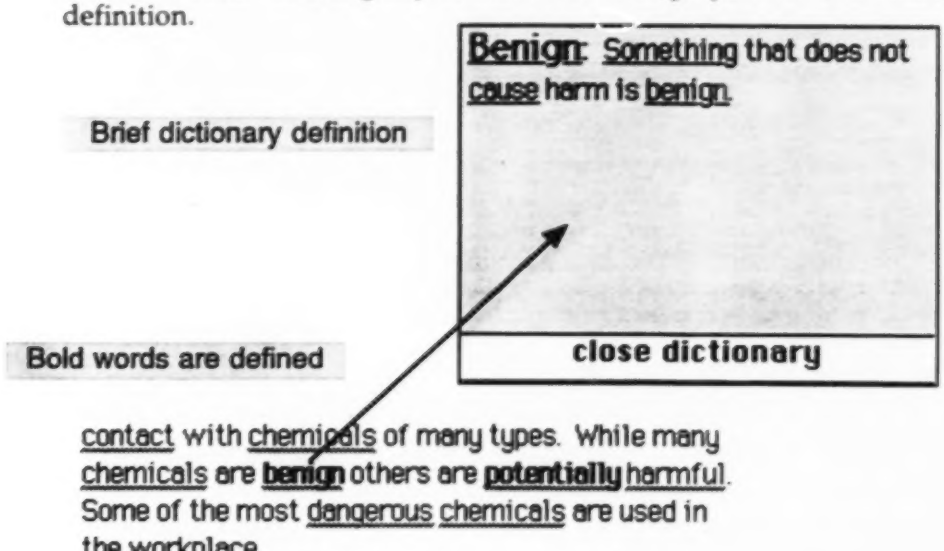
words with spoken versions are underlined. Clicking these underlined words plays their spoken version. For some words the uninflected version of the word is spoken and displayed.


Uninflected version spoken and displayed
Underlined words are spoken
material used to identify a hazardous material
detect
sson covers methods for
detecting and measuring the levels of hazard.
The third lesson describes some of the
personal protective devices that you might
need when working around hazardous
materials.

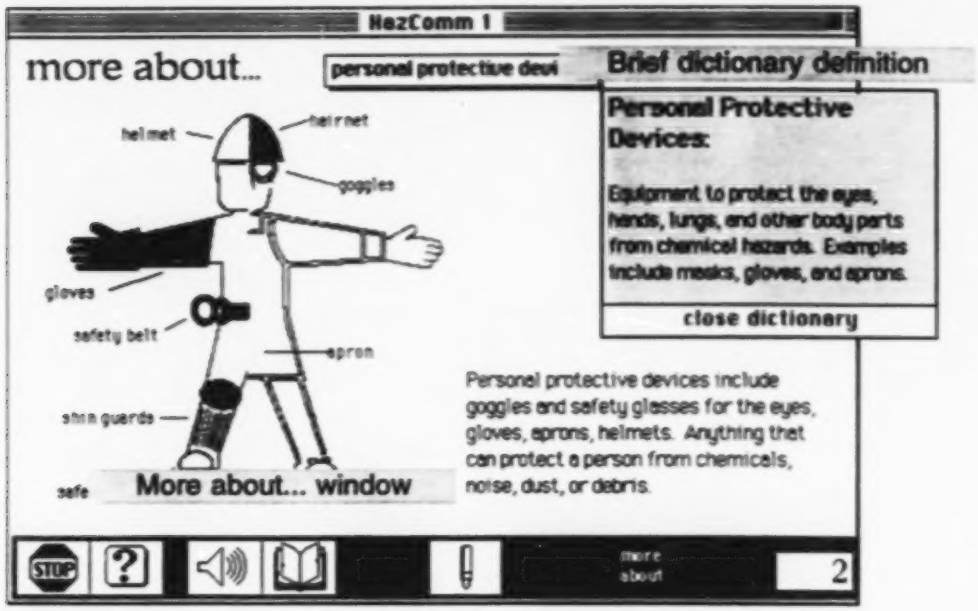
Dictionary and More Abouts

Even with adequate decoding skill, comprehension of more complex material is difficult without sufficient background knowledge. Responsive Text provides background knowledge at two levels.

With the dictionary button ON, words that are defined in text are shown in bold. Clicking any of these words displays a brief dictionary definition.

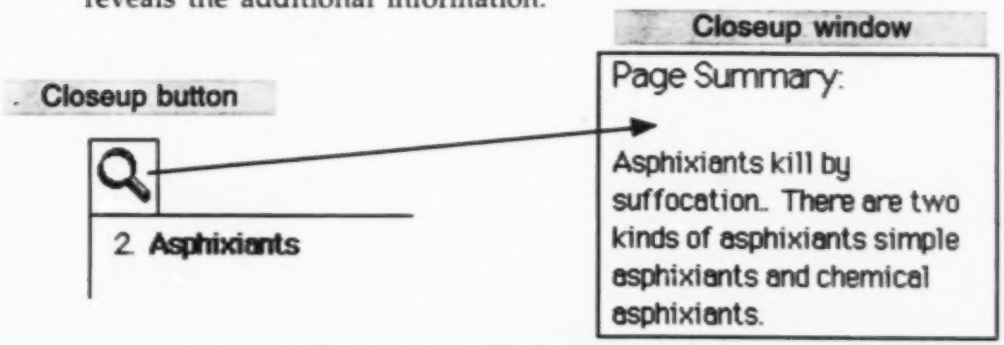

Benign: Something that does not
cause harm is benign.
Brief dictionary definition
close dictionary
Bold words are defined
contact with chemicals of many types. While many
chemicals are benign others are potentially harmful.
Some of the most dangerous chemicals are used in
the workplace.

For concepts that cannot be fully understood with a brief definition, a second level of description is available through the *more about...* button. The *more about...* button appears when these words are defined. Using the *more about...* opens a page with additional text and pictorial information.



Closeups

Even with decoding and background support, understanding text, diagrams, graphs, and other information can be difficult. Closeups provide general purpose support for anything on the screen that may need more explanation. The explanation could include a page summary, a pictorial representation, or even an animation. When you turn on Closeups, the areas of the screen that have closeups are designated with a small magnifying glass icon. Clicking each icon reveals the additional information.

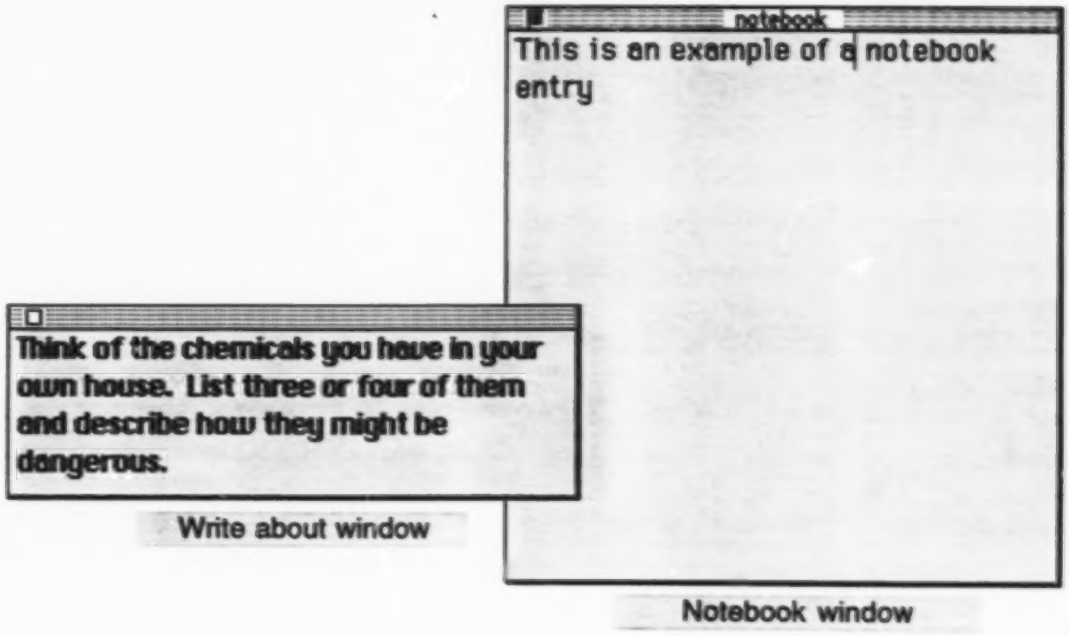

Closeup window
Page Summary:
Asphixiants kill by suffocation. There are two kinds of asphixiants simple asphixiants and chemical asphixiants.
Closeup button
2. Asphixiants

write about

Notebook and Write About.

Writing can be a useful way to further explore what you are reading. It can also be an opportunity to apply new concepts. Writing is integrated into Responsive Text with a notebook that can be opened and used at any time.

To encourage writing some pages have *write about...* buttons that reveal a window with a topic related to the material they have just read.

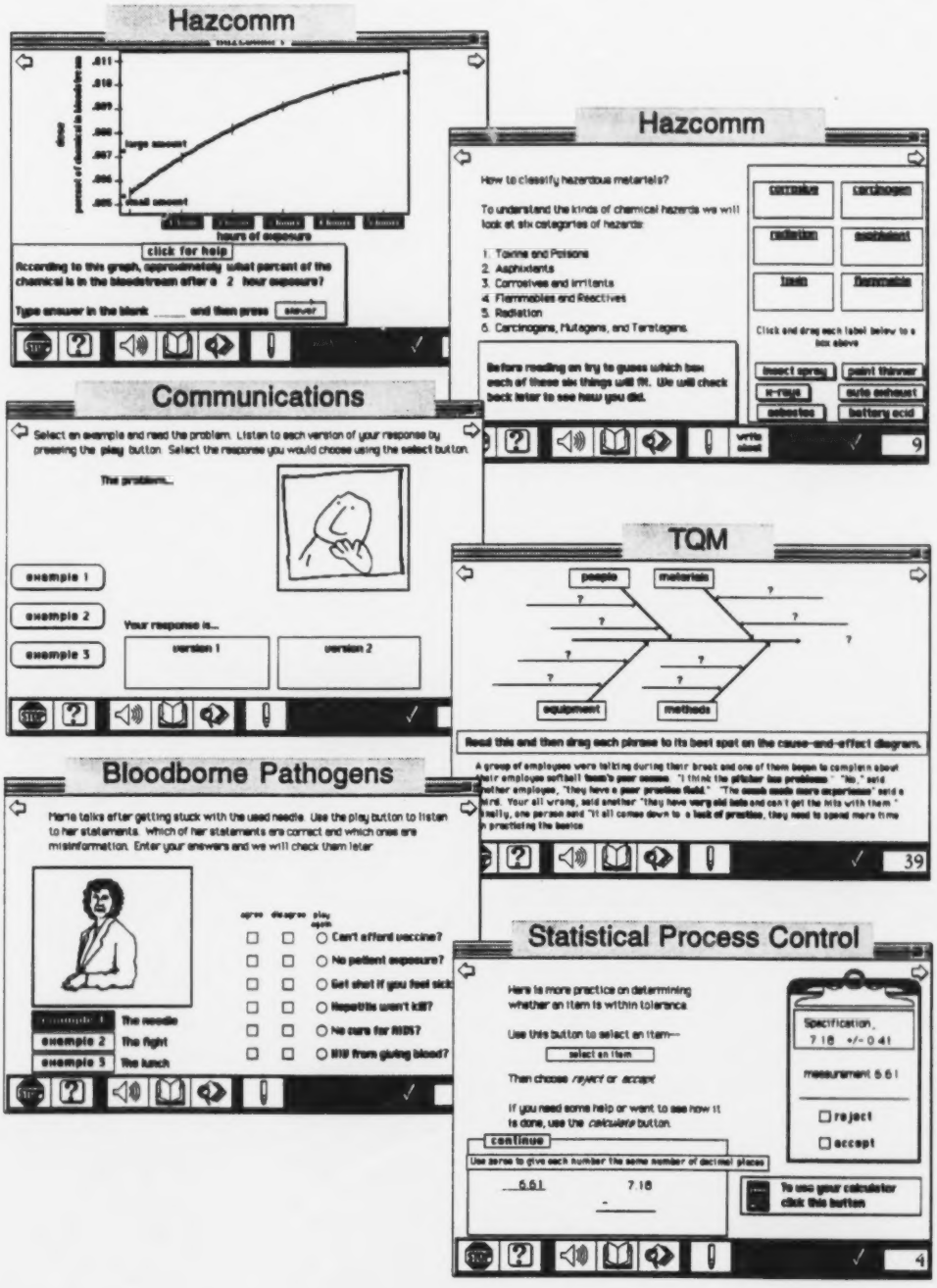

notebook
This is an example of a notebook entry
Think of the chemicals you have in your own house. List three or four of them and describe how they might be dangerous.
Write about window
Notebook window

Checkup Question

Reading is an active process, and Responsive Text uses Checkup questions to insure you understand what you've read thus far. Checkup questions also encourage comprehension monitoring--the active checking of understanding while reading.

Checkups range from simple true-and-false questions to engaging simulations. To encourage you to try the checkups, no performance record is kept.

A selection of Checkups drawn from different lessons....


Hazcomm
click for help
Hazcomm
How to classify hazardous materials?
To understand the kinds of chemical hazards we will look at six categories of hazards:
1. Toxins and Poisons
2. Asphixiants
3. Corrosives and Irritants
4. Flammables and Reactives
5. Radiation
6. Carcinogens, Mutagens, and Teratogens
Before reading on try to guess which box each of these six things will fit. We will check back later to see how you did.
Communications
Select an example and read the problem. Listen to each version of your response by pressing the play button. Select the response you would choose using the select button.
The problem...
example 1
example 2
example 3
Your response is...
version 1
version 2
TQM
people
materials
equipment
methods
Read this and then drag each phrase to its best spot on the cause-and-effect diagram.
Bloodborne Pathogens
Maria talks after getting stuck with the used needle. Use the play button to listen to her statements. Which of her statements are correct and which ones are misinformation. Enter your answers and we will check them later.
Statistical Process Control
Here is more practice on determining whether an item is within tolerance.
Use this button to select an item—
select an item
Then choose reject or accept.
If you need some help or want to see how it is done, use the calculate button.
continue
Specification
7.18 +/- 0.41
measurement 5.61
reject
accept

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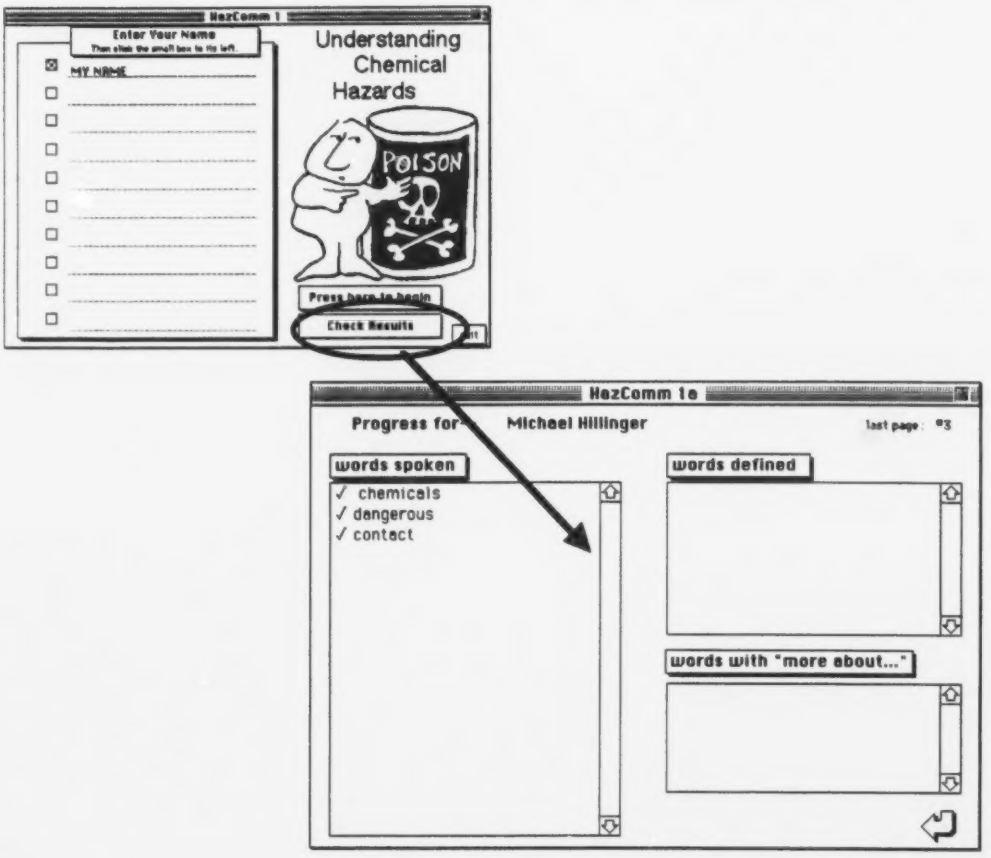
Reviewing Results. As you move through the Responsive Text lesson, the computer tracks your performance. When you return to the title page, you can review your progress using the Check Results button.



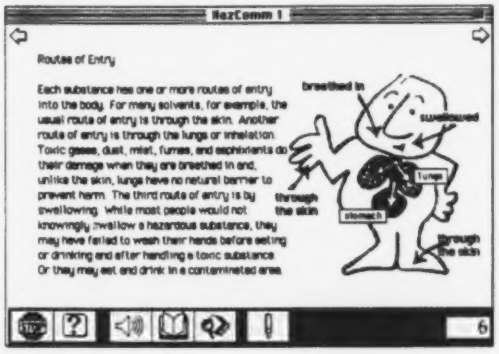
This page lists the words that you requested to be spoken (since not all words have speech, words that are clicked that do not have speech are shown without a check mark). Also listed are the words for which you requested definitions and more abouts, and the last page completed.

Responsive Text Modules

Working with Hazardous Materials

This four-lesson sequence covers the major hazardous materials topics required by the Occupational Safety and Health Administration (OSHA). These materials have been tested in health care, manufacturing, and construction settings.

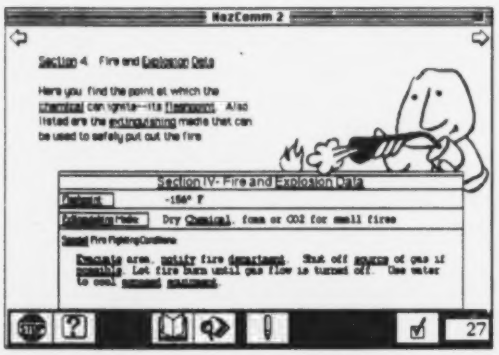
Module 1. Understanding Chemical Hazards


HazComm 1
Routes of Entry
Each substance has one or more routes of entry into the body. For many solvents, for example, the usual route of entry is through the skin. Another route of entry is through the lungs or inhalation. Toxic gases, dust, mist, fumes, and asphixiants do their damage when they are breathed in and, unlike the skin, lungs have no natural barrier to prevent harm. The third route of entry is by swallowing. While most people would not knowingly swallow a hazardous substance, they may have failed to wash their hands before eating or drinking and after handling a toxic substance. Or they may eat and drink in a contaminated area.
breathed in
swallowed
through the skin
through the skin
6

The first module of the series provides an overview of the topic and introduces the employee's right to know, explains how chemicals may affect the body, and describes the six categories of toxic material, (toxins and poisons; asphyxiants; corrosives and irritants; flammables and reactives; radiation, carcinogens, mutagens, and teratagens) and how they can be harmful.

In addition to developing awareness of toxic materials, this module also provides practice in reading and understanding multi-column charts and single-and dual-variable line graphs.

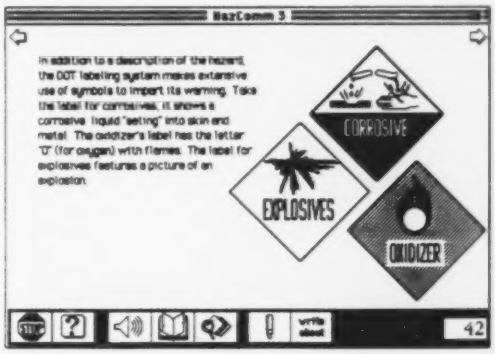
Module 2. Reading & Understanding Material Safety Data Sheets


HazComm 2
Section 4 Fire and Explosion Data
Here you find the point at which the chemical can ignite—its flashpoint. Also listed are the extinguishing media that can be used to safely put out the fire.
Section IV- Fire and Explosion Data
-184° F
Dry Chemical, foam or CO2 for small fires
27

The law requires that all chemical manufacturers supply Material Safety Data Sheets (MDSDs) with their chemical products. Unfortunately, even experienced workers can find these sheets difficult to understand. This module provides a line-by-line overview of the contents of an MSDS and gives practice in interpreting and using the information.

In addition to practice reading MSDSs, this module builds vocabulary and develops skill locating information in a complex document.

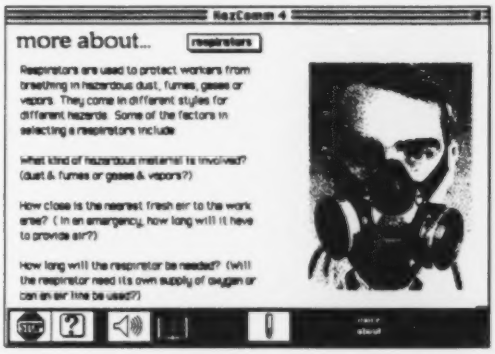
Module 3. Understanding Container Labels


HazComm 3
In addition to a description of the hazard, the DOT labeling system makes extensive use of symbols to impart its warning. Take the label for corrosives, it shows a corrosive liquid "eating" into skin and metal. The oxidizer's label has the letter "O" (for oxygen) with flames. The label for explosives features a picture of an explosion.
CORROSIVE
EXPLOSIVES
OXIDIZER
42

Most companies have adopted a standardized method for identifying the hazards associated with various chemicals. This lesson provides practice in reading and understanding the two most popular labeling methods: the DOT and 704M labeling systems.

In addition to the interactive experience of reading labels, this module provides practice in reading for detail and understanding symbolic systems.

Module 4. Detecting Hazards/Personal Protective Equipment


HazComm 4
more about...
respirators
Respirators are used to protect workers from breathing in hazardous dust, fumes, gases or vapors. They come in different styles for different hazards. Some of the factors in selecting a respirators include
What kind of hazardous material is involved? (dust & fumes or gases & vapors?)
How close is the nearest fresh air to the work area? (In an emergency, how long will it have to provide air?)
How long will the respirator be needed? (Will the respirator need its own supply of oxygen or can an air line be used?)

The first part of this module describes methods for detecting chemical hazards ranging from the human senses to electronic monitoring systems. The second part describes Personal Protective Equipment (PPEs) and how they fit into an overall system of chemical protection.

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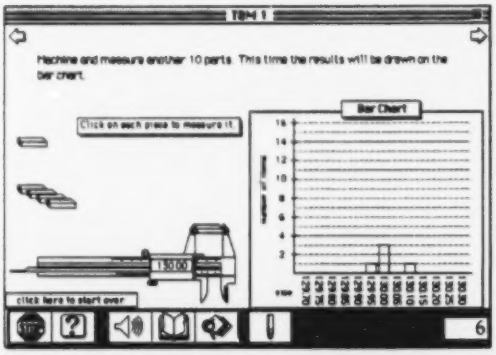
Tools for Quality

Primarily quantitative in nature, *Tools for Quality* introduces some of the skills and techniques used in most TQM programs. *Tools for Quality* has a unique "tracking" feature that provides specialized examples for hospitals, manufacturing, or construction. The three topic areas covered are: Basic Statistics, Charts & Diagrams and SPC.

Module 1. Basic Statistics



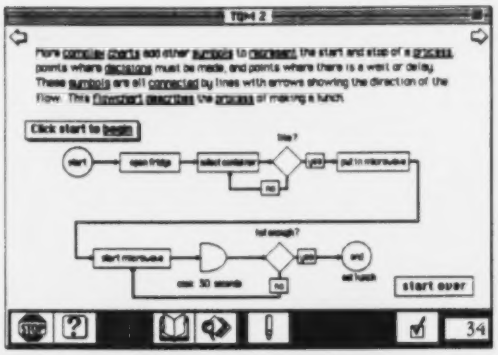
Using examples drawn from health care, manufacturing, or construction, this module provides a painless and highly interactive introduction to some of the basic statistical concepts used in total quality management and SPC.

Beginning with a "hands-on" experience with random variation, the lesson builds the experience into explanations of tolerance, the normal distribution, measures of central tendency, and measures of dispersion.

While the central concepts remain the same, by selecting one of three paths through the lesson, you will see examples relevant for health care, manufacturing, or construction. The screens shown here are examples of how the same concept is treated in each context.

Integrated into these materials is practice constructing and interpreting histograms, using a calculator, and basic math operations.

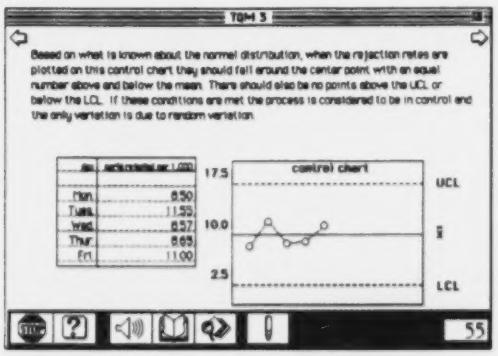
Module 2. Charts and Diagrams



This module covers some of the most often used charts, graphs, and other descriptive tools used in TQM. The exercises stress active participation and include sections on Flow Charts, Cause-and-Effect Diagrams, Pareto Charts, and others.

Among the basic skills supported by this lesson are constructing and reading line graphs, reading for meaning, and basic problem solving.

Module 3. Statistical Process Control



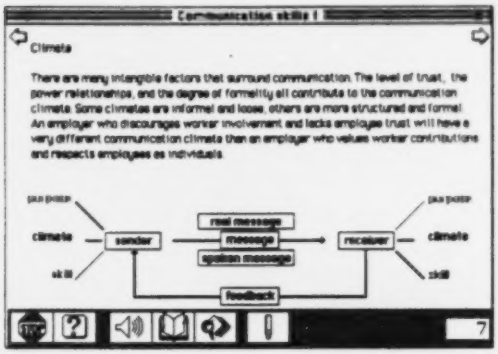
Statistical Process Control (SPC) forms the core of many TQM efforts. Building on the skills learned in *Basic Statistics*, this module covers the skills behind understanding and constructing trend and control charts.

Basic skills include plotting and interpreting, reading graphs, and basic problem solving.

Communications

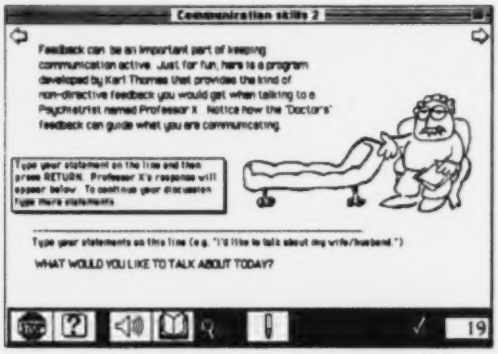
Studies show that the majority of errors in the workplace are a result of poor communication. This translates into millions of dollars in errors and lost productivity. The impetus of this communication series is to improve the learner's ability to communicate in both spoken and written form. Each lesson presents real-life examples to help illustrate good communication skills.

Module 1. Defining Communication


Communication skills 1
Climate
There are many intangible factors that surround communication. The level of trust, the power relationships, and the degree of formality all contribute to the communication climate. Some climates are informal and loose, others are more structured and formal. An employer who discourages worker involvement and lacks employee trust will have a very different communication climate than an employer who values worker contributions and respects employees as individuals.
pre-prep
climate
skill
sender
real message
message
spoken message
feedback
receiver
pre-prep
climate
skill
7

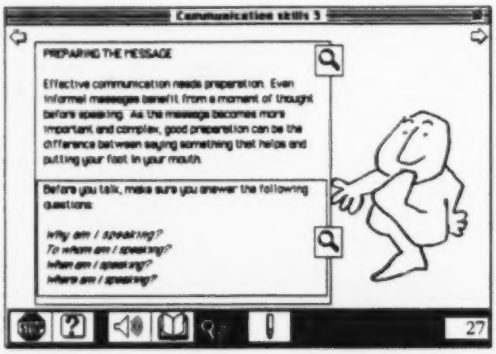
This module provides a foundation for understanding communication. Using a simple model of the communication process, important characteristics of the sender, receiver, and message are described. Digitized speech is used extensively in exercises on providing effective feedback, analyzing messages, and appropriate wording.

Module 2. Active Listening


Communication skills 2
Feedback can be an important part of keeping communication active. Just for fun, here is a program developed by Karl Thomas that provides the kind of non-directive feedback you would get when talking to a Psychiatrist named Professor X. Notice how the "Doctor's" feedback can guide what you are communicating.
Type your statement on the line and then press RETURN. Professor X's response will appear below. To continue your discussion type more statements
WHAT WOULD YOU LIKE TO TALK ABOUT TODAY?
19

This module stresses the importance of the role of the listener in effective communication. Exercises are included on analyzing basic and supporting information, separating fact and opinion, and attending to both verbal and nonverbal messages.

Module 3. Effective Presentations

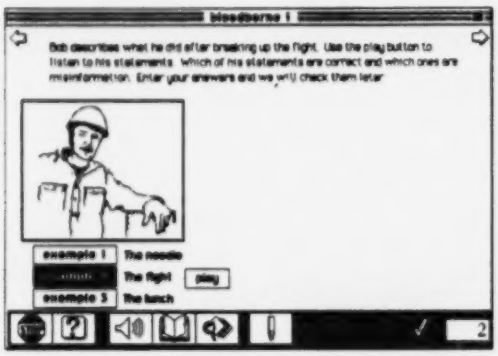

Communication skills 3
PREPARING THE MESSAGE
Effective communication needs preparation. Even informal messages benefit from a moment of thought before speaking. As the message becomes more important and complex, good preparation can be the difference between saying something that helps and putting your foot in your mouth.
Before you talk, make sure you answer the following questions:
Why am I speaking?
To whom am I speaking?
When am I speaking?
Where am I speaking?
27

Effective verbal presentation is important with audiences of any size - one person or one thousand. This module describes the steps in preparing a message, delivering it well, and monitoring the response of the listener.

Bloodborne Pathogens

This two-module sequence on bloodborne pathogens covers the major topics required for training by the Occupational Safety and Health Administration (OSHA). Basic skills involve understanding complex vocabulary and using levels of headings as a guide for reading.

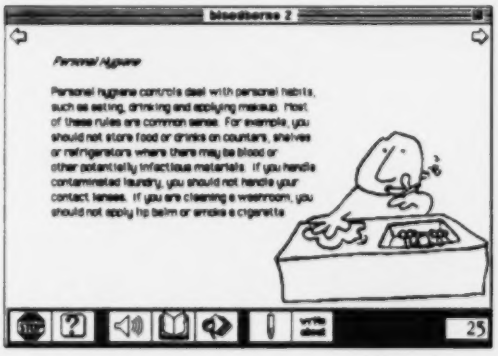
Module 1. Bloodborne Pathogens Basics



This lesson lays the groundwork by explaining about Universal Precautions, Exposure Control Plans, the Hepatitis B virus (HBV), the Human Immunodeficiency virus (HIV), vaccinations, how bloodborne viruses are transmitted, and what to do in a case of exposure.

Basic skills include finding and interpreting information in text.

Module 2. Bloodborne Pathogens Safety

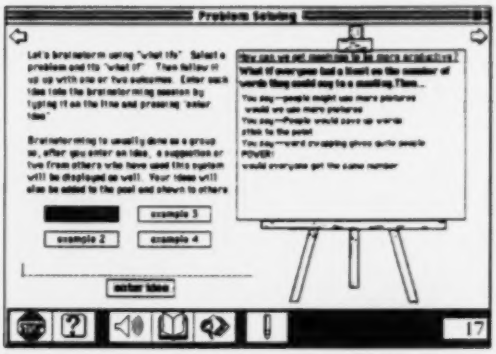


This lesson discusses proper engineering controls, work practice controls, and personal protective devices. It also looks at cleanup strategies for equipment and laundry, handling regulated waste, and proper labeling and color coding of potentially infectious materials.

Practice in skimming text for information, understanding levels of heading, and reading charts is integrated into the material.

Creative Problem Solving

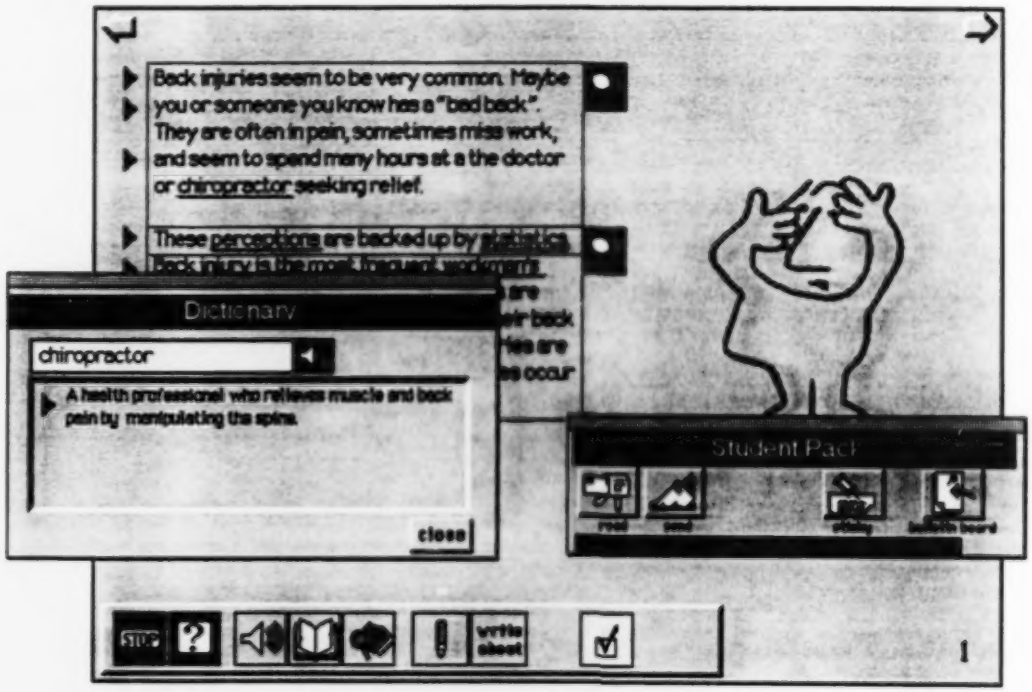
Creative Problem Solving encourages users to participate and think! In addition to the usual Responsive Text support features, Creative Problem Solving simulates brainstorming sessions where users type in their own responses. These responses are saved to be displayed again as part of the brainstorming response for other users. As users work through the problem-solving process, they are encouraged to apply the techniques they learn to a problem of their own choosing.



In this example you are exploring a brainstorming technique called "what ifs." Here it is being applied to improving the productivity of meetings. Each time you enter an idea, responses from previous users display on the easel. You use those ideas to generate more ideas, similar to a real brainstorming session.

Continuing Development

Responsive Text continues to evolve. A new version of Responsive Text materials is now being developed and will be tested in 1996. This generation contains all of the features found in the existing materials as well as new writing and communication tools in a Student Pack window. These tools will allow you to write, comment, and even add to the information contained in the lesson. A sample screen from the upcoming Back Safety module is shown below.


Back injuries seem to be very common. Maybe you or someone you know has a "bad back". They are often in pain, sometimes miss work, and seem to spend many hours at a the doctor or chiropractor seeking relief.
These perceptions are backed up by
Dictionary
chiropractor
A health professional who relieves muscle and back pain by manipulating the spine.
close
Student Pack
write about
1

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